What Does Success Look Like at a Govt Lab, Academia, industry, vs Start-Up Company?
Distinguishing the Attributes of a Professional in Different Working Cultures

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Mark Horstemeyer Background

- **15 years: Sandia National Labs (govt lab)**
- **10 years: Mississippi State University (academia)**
- **1 year: Owens Corning Fiberglas (large company)**
- **5 years: Predictive Design Technologies (start-up company)**

Science of Success (Koch) can occur in any working environment

- Success is optimizing human action; science of optimizing human action

- Five dimensions

  - *Vision/Mission*: Determining where and how the organization can create the greatest long-term value

  - *Virtue and talents*: Helping ensure that people with the right values, skills and capabilities are hired, retained and developed

  - *Knowledge processes:* Creating, acquiring, sharing and applying relevant knowledge, and measuring and tracking profitability

  - *Decision rights:* Ensuring the right people are in the right roles with the right authority to make decisions and holding them accountable

  - *Incentives*: Rewarding people according to the value they create for the organization *October 7-11, 2012 – Pittsburgh, Pennsylvania*

Science of Success Relation to Hiring Options

Dimensions of success	Govt Labs	Academia	Large Company	Start-Up Company
Vision/mission	Security (weapons & energy	Educating students	Specific to niche	Specific to niche
Virtues/Talents	PhD desired	PhD required	BS degree	BS degree
Knowledge Processes	Teaming environment; more limited focused work	More individualistic; more freedom in work topics	Bottom line focus; strategic	Bottom line focused; tactical
Decision Rights	Modest accountability	Not too accountable	Greatest accountability	Modest accountability
Incentives	High quality of life	Great human impact	Varies with company	Great financial rewards

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Summary of Attributes

	Intellectual Freedom	Salary	Teaming	Leave work at work	Benefits	Innovation	Science	Citizenship service
govt lab	85	75	100	100	100	70	100	80
academia	100	85	50	80	95	95	95	100
large company	70	70	95	75	85	85	50	50
start-up company	80	100	90	30	50	100	30	30

	Travel	Security	Organization	Grants manship	Publish	Mentors	Teaching	Progress to management
govt lab	100	100	100	75	80	80	30	75
academia	90	100	80	100	100	100	100	70
large company	80	90	100	30	60	70	50	100
start-up company	70	30	70	80	40	30	30	85

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Qualities of an Effective Professor

- **Teaching**
- **Research**
- **Journal Article Writing**
- **Mentorship of Graduate Students**
- **Grantsmanship/Proposal Writing**
- **Citizenship/Service to Others**
- **Team Player/Collaborations**
- **Organizational Skills**

Teaching/Learning

- Teaching is the "giving of information" and learning is the "receiving of information"
- Acting, bringing energy to the classroom; know as many names as possible of the students and call them by name
- Have a willingness to bring research into the teaching environment
- Employ different methods: distance learning, hands-on, practical applications; move teaching methods as the audience changes
- Have a sense of humor
- Be available
- The students need to know that you care
- Necessary but not sufficient condition for tenure

Research

- Production: keep publishing in the area of your PhD

- Production Capability: Think about off-shoot research areas to grow from your PhD

- Look for high impact researchers to collaborate with

- Ask more seasoned successful researchers what areas would they get into if they were starting over

- Be ready to try new research areas; don't be stuck in just one area (Who Moved My Cheese means the funding sources will change and you need to move)

- Think about the future and what engineering technologies of tomorrow will drive the research of today

- Keep the notion of what will be your impact (journal impact factor, on students, on society)

Journal Article Writing

- This is by far the most important influential, impacting attribute that one can grow into
- Decide on journals based upon the citation impact factor and have a strategy to rotate your article submissions to several of those journals to broaden the readership
- Keep prioritized list in front of you everyday of the working journal articles and "focus and finish" your number one on the list with every spare (or planned) moment
- Read good writers; not every journal article is written well
- If Journal Article Writing is the "cause," the "effects" are the following:
  – Proposals being won (proposals without publications will not win because the reviewers will question the ability of the proposer)
  – Impact factor increasing
  – Influence on research community (this is a long term effect)
  – Prestige for your institution
  – Invitations to speak at other institutions

Mentorship of Graduate Students

- This is really a part of "Teaching," but because of its importance needs to stand alone
- Greatest influence on an individual's life can occur here, because you will set the course for their career
- Meet periodically (every relationship is different) with student or with the group together
- Set up the environment so the grad students learn from each other
- Understand social styles of mentor and grad students (driver, analytical, amiable, and expressive)
- Train them in three areas:
  - *Research*: analyzing and thinking deeply and thoroughly on a topic in a pro-active not reactive manner
  - *Writing*: communicating their research through this venue helps focus the research and document their efforts. I say three journal articles and then they are done.
  - *Speaking*: communicating their research through this venue also helps focus and organize their research. This skill helps prepare them for their career

Grantsmanship/Proposal Writing

- **Talk to the program manager before submitting a proposal; relationships are important.**
- **You need to substantiate your proposal with your journal articles**
- **Take the proposal writing as an opportunity to collaborate with a more experienced researcher to get new ideas**
- **Proposal writing is difficult and takes time, but the results are great when you win a grant**
- **Diversify your portfolio with different funding sources**
- **I often write a proposal after the work is done but before the associated papers are written; this brings clarity to the proposal and ensures success**
- **Read winning proposals**
- **Four steps to every proposal:**
  - **Current state of the art: lit review**
  - **Future state after you complete the proposed project: your vision**
  - **Challenges/Barriers that have hindered researchers to realize the future**
  - **Research Roadmap: to overcome the challenges/barriers and place here any preliminary results to help the reviewers see that you can do the work**

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Citizenship/Service to Others

- **To industry/society: join societies and become members or working groups; this will lead you to becoming a fellow someday and will indirectly help you in other's reviewing your journal articles and proposals**
- **To your university: helps you see the bigger picture and affords opportunities of growth**
- **To your department/college: builds camaraderie and trust in relationships**

Team Player/Collaborations

- **Most journal articles and proposals are published with multiple names these days indicating the role of good collaborative teams**
- **You get different ideas and can synergize**
- **Identify your weaknesses and try to fill them by collaborating with others with those strengths**
- **Think of people within your department, college, university, country, and then internationally and come up with a plan to work with them**
- **Sometimes offering your student to spend time with the other collaborator is a good idea as it forces the relationship to a deeper level**
- **Think of the "win" for the potential collaborator; why would that person want to collaborate with you**

Organizational Skills

- **Start with the end in mind (your life, your career, your time in that job, etc.)**
- **Lay out your vision, then mission, then goals, then objectives, and then tasks**
- **Place emails, papers, etc. into categories so that when they cross your path, they have a place to go to**
- **I organize journal articles by authors names and topical areas so sometimes I put one article in two locations**
- **Plan your year, your semester, your day; if you fail to plan, you plan to fail**
- **Read "7 Habits of Highly Effective People"**
- **Manage your time well; don't let the "urgent" negate the "important"**

Social Styles

Project focused

Inward

Analytical	**Driver** **Mark Horstemeyer**
Amiable	**Expressive**

Outward

People focused